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ABSTRACT

The guide for a high school level auto body program provides learning activities for the special needs student. The program was developed taking into consideration the abilities of the students so that learning activities are within the grasp of the student, successful achievement is possible, and students are developed to a level where they can meet the working standards of the trade and become employable. Eighteen units are presented each including performance objectives, basic content, and suggested activities for shop practice and the classroom. Also presented are a student progress chart and student vocational inventory. (LJ)

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State of New Jersey
Department of Education
Division of Vocational Education

AUTO BODY

AN ADAPTIVE AND DEVELOPMENTAL PROGRAM FOR SPECIAL NEEDS STUDENTS

Teachers Guide

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State of New Jersey
Department of Education
Division of Vocational Education

AUTO BODY
AN ADAPTIVE AND DEVELOPMENTAL PROGRAM
FOR
SPECIAL NEEDS STUDENTS

TEACHERS' GUIDE

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Introduction

This auto body program provides an adaptive and developmental program for special needs students. There are two important considerations when working with special needs students. First, the program must be adapted to the abilities of the students. The learning activities must be within the grasp of the students; successful achievement is important. Second, we must develop the student to a level where he can meet the working standards of the trade; he must be employable.

Students enrolled in this program have three options.

1. They can transfer, or 'mainstream,' into the regular vocational high school auto body program when they have developed the work habits and learning skills needed for success in that program.

2. They can transfer, or 'mainstream,' into another regular vocational high school program when they have developed the work habits and learning skills needed for success in the respective program.

3. They can continue in this program until graduation. Successful completion of the program would qualify them as an auto body helper.

Instructors who implement this program should remember that what is important for one student may not be important to another student. The choice of instructional method may make a big difference. Student variables such as intellect and personality must be taken into account. An attempt has been made to define those teaching activities that have proven successful. While the activities are not mandated, the objectives of each unit must be attained for successful completion. The suggested activities provide one route for specific student achievement; there may be other routes. Each instructor will want to evaluate each learning activity in respect to his students.

A. Performance Objectives

Upon completion of this unit, the students will be able to:

1. Identify and locate all sources of power for:
   a. Lights
   b. Portable equipment
   c. Stationary equipment
2. Identify and cite the use of all tools within the tool room.
3. Locate and describe the use of all normal emergency exits.
4. Open, close and safely operate all overhead doors.
5. Demonstrate an ability to employ trade vocabulary and jargon when:
   a. Discussing supplies
   b. Describing tasks
   c. Performing tasks
   d. Naming basic tools
6. Demonstrate an ability to exercise precaution regarding shop safety.
7. Demonstrate an ability to use a variety of shop manuals.
8. Demonstrate an ability to interpret their own growth within the trade by referring to their individual progress records.

B. Basic Content

1. Overall view of the trade
2. Shop rules and procedures
3. Shop vocabulary
   a. Materials
   b. Basic tools
   c. Equipment
   d. Parts
4. Safety
5. Trade hygiene
6. Shop housekeeping
   a. Care of all tools, materials, equipment
   b. Care of work space
   c. Tool room procedures
7. Students' progress records

C. Suggested Activities

Shop Practice

1. Lectures

2. Demonstrations
   Example: How to safely use floor jack stands.

3. Guided student practice

Classroom

1. Students can bring in trade magazines (If possible, visit a body shop and ask for old editions).
2. Keep a folder in which the students can keep materials
3. Keep a notebook
4. When a unit is complete, a student can take his materials and make a booklet, which can develop into his own text.
5. The student will demonstrate the basic content using his own media to express himself by way of:
   a. Poster
   b. Collage
   c. Pen, pencil, tempera paint – drawing and describing
   d. Writing
   e. Cut-outs – Example: Trace himself on brown paper and fill in the clothing with work clothes (showing how a student should dress for work). Cut out from old tool booklets– box wrenches and open-end wrench.
6. Listing and matching
7. Making mock-ups
8. Printing vocabulary words for classroom display as well as identifying
9. Audio, video materials

A. Performance Objectives

Upon completion of this unit, the student will be able to:

1. Perform all operations with the proper safety equipment.
2. Dress in a proper workman-type manner.
3. Groom in a safe workman-type manner.
4. Behave in a safe workman-type manner.
5. Be responsible for his and his fellow classmates' safety.

B. Basic Content

1. Safety equipment
   a. Goggles or safety glasses
   b. Paint filter mask
   c. Rubber gloves
   d. Hard sole shoes
   e. Jack stands
   f. Explosive type cans
   g. Fire extinguishers
   h. Hair nets

C. Suggested Activities

Shop Practice

1. Review lectures (follow up from classroom)

2. Demonstrations
   Example: Proper wearing of hair net, goggles, fire extinguisher operation, etc.

3. Guided student practice

4. Peer group review

Classroom

1. Notebook work:
   a. List characteristics of a good mechanic.
      Example: competence
      efficiency
      attention
      orderliness
      courtesy
   b. List the basic content and other safety precautions such as:
      - carbon monoxide
      - fire
      - acids
      - tools
      - grease and oil

- electrical work
- hot objects
- working with automobile such as hood closing and front or rear door closing, running car in shop, operating automobile while on rack or jack stands, etc.

2. The student can demonstrate his ability by using his own media as listed in Unit I. Also to bring out the student, acting or role playing in front of the class can be effective.

   Example: The student can explain precaution of shop safety. The criteria for success is based on how well he explains the given object such as:

   - gasoline and oil spills
   - safety goggles
   - hair nets
   - jack stands

3. Audio, video materials

A. Performance Objectives

Upon completion of this unit, the students will be able to:

1. Identify and select the most effective hand tools to support given operations.
2. Treat hand tools as their own investment in themselves and exercise care and caution in the use of tools.
3. Demonstrate effective tool usage while performing given tasks.

B. Basic Content

1. Screwdrivers
   a. Philips
   b. Standard tip
   c. Offset
   d. Special

2. Wrenches
   a. Open-end wrenches
   b. Box wrenches
   c. Combination wrenches
   d. Socket wrenches and drivers
   e. Special purpose wrenches
   f. Wrench sizes
      (1) Inch
      (2) Metric

3. Pliers
   a. Combination pliers
   b. Battery pliers
   c. Drip moulding pliers
   d. Diagonal cutting pliers
   e. Needle nose pliers
   f. Trimmer pliers

4. Vise grips and clamps
   a. Vise grips
   b. Vise grip bending tools
   c. Vise grip welding clamps
   d. Vise grip "C" clamps
   e. Continental "C" clamps

5. Hacksaws
   a. Handles
   b. Blades
   c. Blade sizes

6. Files
   a. Vixen body files and holders
   b. Single cut
   c. Double cut
   d. Sizes and grades of files

7. Chisels
   a. Diamond point chisel
   b. Round nose chisel
   c. Cold chisel
   d. Cape chisel
   e. Panel cutting chisel

8. Punches
   a. Center punch
   b. Starting punch
   c. Pin punch
   d. Drift punch
   e. Scratch anvil

9. Snips
   a. Hand snips
   b. Power snips
   c. Aviation snips

10. Twist drills
   a. Speed
   b. Size

11. Hammers
   a. Bumping hammers
   b. Dinging hammers
   c. Pick hammers
   d. Round and square face hammers
   e. Cross peen hammers
   f. Ball peen hammers
   g. Shrinking hammers
   h. Trim hammers
   i. Slide hammers

12. Dolly Blocks
    a. Bar dolly
    b. Budd dolly
    c. Tow dolly
    d. Heel dolly
    e. Wedge dolly
    f. General purpose dolly

13. Spoons
    a. Pry spoons
    b. Spring hammering spoons
    c. Back-up spoons
    d. Driving spoons
    e. Adjustable power spoons

14. Pry Bars
    a. Curved pries
    b. Short pries

C. Suggested Activities

Shop Practice

1. Select proper hand tools.
   a. Identify tools.
   b. Assemble and disassemble
      (1) Have an old car for disassembling (saving all nuts, bolts, washers, fasteners, etc.)
      (2) Car doors
      (3) Any type of equipment that can be disassembled.
   c. Demonstrate proper use:
      Example: (1) box wrenches – their purpose; (2) how to hookup rachet set with rachet extension bar, etc.; (3) care and storage of hand tools; (4) hand sawing; (5) hand cutting or use of hand chisels, (6) hammering, etc.

Classroom

1. Student can draw and describe a complete list of tools for his folder. (Keep in mind the use of a ruler, straight lines, neatness, etc.)
2. Hand print the name of hand tools on poster board for classroom bulletin boards.
3. Some printed poster boards can be used for vocabulary and shop jargon.
4. The students can be put into groups and make mock-up boards relating to the unit.
   Example: A group can do sockets, box wrenches, open-end wrenches, etc.
5. As a type of competency test,
   a. Students can select tools and identify each tool by name, size, etc.

b. State why the tool is used instead of another tool.
c. State safety precautions for using tools. This will lead to the shop work of disassembling and assembling.

6. Have students make an oversized inch ruler. The student places his thumb on the ruler as the instructor calls out various numbers. Instructor may walk around the room and check on each individual.
7. Audio, video material

A. Performance Objectives

Upon completion of this unit, the students will be able to:

1. Identify, assemble, disassemble, maintain, and utilize the listed power tools to maximum advantage.
2. Display effective safety features while performing work with given power tools.

B. Basic Content

1. Electric grinders
   a. Portable
   b. Pedestal
2. Electric sanders
3. Electric polishers
4. Air sanders
5. Body jacks
   a. Push jacks
   b. Pull jacks
   c. Mechanical jacks
   d. Air pump jacks
   e. Jack attachments
   f. Body jack set up
6. Floor jacks and dollies
   a. Air-driven floor jacks
   b. Mechanical floor jacks
   c. Hydraulic frame jacks
   d. Jack stands
7. Car lifts
   a. Four-post lift
   b. Two-post lift
   c. Single-post lift
   d. Electric post lift
8. Bench grinders
   a. Grinders
   b. Wire wheels
   c. Grinders safety

9. Air hammers
   a. Panel cutters
   b. Chisels

10. Electric drills
    a. Sharpening drill bits

C. Suggested Activities

Shop Practice

1. The student will demonstrate an ability to use various power tools.
2. Demonstrate safety at all times
3. The student will clean and replace each tool to its location.
4. Use suggested materials such as deck door, deck lids, hoods, turret tops, etc.
5. Students can demonstrate drilling by:
   a. Picking a bolt
   b. Picking the proper drill pit
   c. Installing the pit
   d. Keeping safety in mind
   e. Drilling a hole
   f. Installing bolts with nut, etc. (Using the proper tools could be like a competency test.)

Classroom

1. Student can continue working in his own medium as listed in Unit I, making a complete list of power tools for his folder.
2. New vocabulary words can be listed and made for the classroom bulletin board.
3. Sandpaper can be introduced here.
4. Demonstrations of removing and replacing sandpaper and grinding disc on the various power sanders and grinders.
5. List the grinding disc by grit.
6. List sandpaper grits.
7. Give characteristic of sandpaper and grinding disc.
8. Students can explain on several types of jobs where the different power tool is used.
   Example: Rust work and finish work.
9. Audio, video materials

A. Performance Objectives

Upon completion of this unit, the students will be able to:

1. Perform repair operations using auto body type fasteners.
2. Design and make fasteners according to his needs.

B. Basic Content

1. Bolts and screws
   a. Cap screws
   b. Carriage bolts
   c. Bumper bolts
   d. Studs
   e. Machine bolts
   f. Standard bolts
   g. Stove bolts
   h. Metal screws
   i. Special bolts

2. Special purpose fasteners
   a. Moulding clips
   b. Speed nuts
   c. Welded studs
   d. "T" bolts
   e. Plastic moulding clips

3. Washers
   a. Flat washers
   b. Lock washers
   c. Spacing washers

4. Rivets
   a. Hollow rivets
   b. Solid rivets
   c. Exploding rivets
   d. Pop rivets

C. Suggested Activities

Shop Practice

1. From old car, doors, fenders, hoods, deck lids, remove all fasteners.
2. Select proper tools for various operations.
3. Arrange by thread and proper nuts.
4. Demonstrate by making various fasteners

Classroom

1. Student can continue working in his own media, drawing and describing various screws and fasteners for his folder.
2. Increase trade vocabulary as in other units.
3. Develop mock-ups for fasteners.
4. Students can bring in fasteners.
5. Students can make their own fastener container from a plastic milk container.
6. This can be brought to his seat where the student can remove and replace nuts from fasteners.

A. Performance Objectives

Upon completion of this unit, the students will be able to:

1. Examine all jobs prior to commencing straightening operations.
2. Determine steps needed to perform straightening, given a set of assimilated and real circumstances.
3. Differentiate between effects of hammering, opposed to shrinking and applying each to maximum advantage.
4. Straighten doors, hood, fenders, quarter panels, and deck lids to instructional specification.
5. Straighten body sections, turret tops, center posts, floor sections, and cowl sections.
6. Identify high and low spots by feeling and sight identification.
7. Straighten bumpers inflicting minimum hammer mark distortions.

B. Basic Content

1. Effective tool selection
   a. Hammer sizes for given tasks
   b. Dollies
   c. Spoons

2. Part identification
   a. When to remove
   b. How to remove
   c. Why remove

3. Undercoating removal
4. Aligning
5. Replacement
6. High and low spot identified
7. Recognition of completed task

C. Suggested Activities

Shop Practice

1. Practice on old doors, hoods, deck lids, fenders, etc.
2. Students will select the proper tool for each use.
3. Demonstrate safety at all times.
4. Students will recognize high and low spots
   a. Peening
   b. Filing
   c. Grinding
5. Students can remove undercoating from back of surfaces to be straightened.
6. Demonstrate aligning by what to look for.

Classroom

1. Continue as other units, making materials for folders.
2. Increase vocabulary.
3. Have students explain various tasks and basic straightening.
4. Discuss how the damage occurred:
   a. Direction of impact
   b. Have student note this information to instructor after viewing automobile. This will increase his trade jargon.
5. Explain aligning hoods, doors, fenders, and deck lids.
6. Along with shop practice, have student know and recognize when the straightening process has been manipulated satisfactorily.

A. Performance Objectives

Upon completion of this unit, the students will be able to:

1. Perform all tasks pre-requisite to the effective use of oxyacetylene welding.
   a. Equipment set-up
   b. Regulator installation
   c. Hose connections
   d. Size tip to use
   e. Ignite torch
   f. Flame adjustments
   g. Safety practices
   h. Gauge settings

B. Basic Content

1. Safety precautions:
   a. Examine equipment
   b. Proper pressure per gauge
   c. Solution for backfire
   d. Solution for flashbacks
   e. Periodically test welding outfit for leaks.

2. Basic accessories for welding with oxyacetylene:
   a. Oxygen cylinders
   b. Acetylene cylinders
   c. Regulators
   d. Gauges
   e. Cutting attachments
   f. Hose
   g. Goggles
   h. Lighters
   i. Wrench
   j. Tips

3. Setting up
4. Flame regulations
5. Welding principles
6. Welding practices
7. Metal shrinking
8. Oxyacetylene cutting
9. Bronze welding – brazing
10. Soldering and lead filling

C. Suggested Activities

Shop Practice

1. The student will demonstrate an ability to employ the procedure in preparing and shutting down an oxyacetylene torch
   a. Clean the welding table properly.
   b. Gather the appropriate materials.
   c. Set up equipment correctly.
      Check: cylinder
      valves
      attached regulators
      attached hoses
      tips
      adjust valves
   d. Light the torch and adjust the flame.
2. Shut off the torch. Sht off the cylinder valves. Bleed both gas lines:
   a. Acetylene
   b. Oxygen
3. Release the regulator adjustment.
4. Wrap the hose and torch around the cylinder.
5. Clean and store all materials in their proper place.

Classroom

1. Continue making materials for folder. Increase vocabulary. Make mock-ups. Keep up bulletin boards. Draw and describe:
   sectioned drawing of torch, tips, cylinders, gauges, and attachments.
2. Have students explain safety precautions to each other.
   a. Examine equipment
   b. Proper pressure per gauge
   c. Solution for backfire
   d. Solution for flashbacks
   e. Check welding outfit for leaks.
3. Discuss welding principles
   a. How the gas oxyacetylene welding and cutting process works.
   b. Explain the three types of flames.
   c. Explain how these flames are created.
   d. Explain how and when these different flames are used.
4. Using mock-ups:
   a. Identify each component by its proper name.

A. Performance Objectives

Upon completion of this unit, the students will be able to:

1. *Differentiate* between electric arc as opposed to the spot welding technique and utilize each to maximum advantage.
2. Utilize specified safety precautions while performing given electric arc and spot welding tasks.

B. Basic Content

1. Characteristics of arc welding
2. Equipment
   a. Motor generator type of arc welding
   b. Transformer type
   c. Electrodes
   d. Electrode holder
   e. Welding shields
   f. Safety clothing
3. Welding practices
4. Arc cutting
5. Arc welding safety practices
6. Characteristics of spot welding
7. Equipment
8. Safety practices

C. Suggested Activities

Shop Practice

1. Lecture – continue in relationship with classroom.
2. Demonstration.
3. Individual student study.
4. Peer group review.
   Example: Demonstration
   a. Clean the welding table properly.
   b. Set up the welding machine. AC power.
   c. Set the amount of current required for the job.
   d. Connect the work lead to the table.

Classroom

1. The students will continue to make drawings and mock-ups for their folders and bulletin boards of the equipment listed in the basic content.
2. Vocabulary list will be increased. (Printed words for display as well as recognition.)
3. Student can write the characteristics of arc welding.
   Welding principles
   Safety

e. Start welding. (Review all safety precautions)
f. Shut down the welding machine by turning off the power at the machine, hang up the lines, clean off the table and equipment.
g. Store all materials in their proper places.
h. Have old fenders, doors, hoods, deck lids, for patch spot welding work.
   (1) Have student examine job.
   (2) Prepare spot for spot welding work. Explain why we clean rust, old paint, dirt, etc.
   (3) Along with the classroom work, students can make templates for the areas to be repaired by drawing and cutting them out.
   (4) Trace on sheet metal and cut out.
   (5) Set on job for fitness.
   (6) Set spot welder, hold sheet metal into position, and spot weld.

4. Write the characteristics of spot welding:
   a. Spot welding principles
   b. Safety
5. In front of the class, the student will explain:
   a. The shield and other equipment.
   b. The metal arc.
   c. Spot welding to his group.
6. Show how a template can be made for repair spot weld work.
7. Audio, video materials

ASSEMBLY AND DISASSEMBLY: SHEET METAL AND TRIM — UNIT IX

A. Performance Objectives

Upon completion of this unit, the students will be able to:

1. Remove, refinish, and re-assemble given items according to instructional procedures.
2. Continue to utilize manual and power tools safely and to maximum advantage.
3. Demonstrate continued competence and technique refinement while performing varied though repeated tasks.
4. Perform all tasks within given assembly and disassembly operations under instructional supervision.

B. Basic Content

1. Replacement parts
   a. Fender
   b. Doors
   c. Quarter panels
   d. Trunk lids
   e. Hoods
   f. Grills and deflectors
   g. Bumpers
   h. Headlamps
   i. Mouldings
   j. Rocker panels
2. Safety precautions

C. Suggested Activities

Shop Practice

1. Have student prepare himself:
   a. Examine job
   b. Evaluate job
2. Select the proper tools and equipment
   a. Use tools and equipment properly
   b. Demonstrate safety
3. Remove and replace sheet metal parts and trim.
4. Have an old car.
5. Clean area and tools, replace all tools to proper places.

Classroom

1. The student will continue working with his own notebook and folder, within his own media:
   a. Draw and describe the replacement parts for his folder as listed in the basic content.
   b. Make mock-ups for classroom bulletin boards.

c. Make a vocabulary list, pr
vocabulary words on pl
cards for classroom disp
(so student can che
spelling.)

2. Oral participation from studen
Naming the various parts of t
automobile.

3. Name and match quiz of vario
automobile parts; can be
evaluation test for the student.

a. What to look for during t
evaluation. Did the stude
categorize and classi
information for his quiz a
his notebook folder properl

4. Audio, video materials

A. Performance Objectives

Upon completion of this unit, the students will be able to:

1. Perform operations in maintaining the shop by performing daily cleaning tasks.
2. Repair equipment as required.
3. Maintain shop lavatory facilities.
4. Keep tools organized and checked in and out in tool room.

B. Basic Content

1. Windows
2. Floors
3. Walls
4. Lights
5. Equipment
6. Workbenches
7. Lockers
8. Drains
9. Doors
10. Desks
11. Blackboards
12. Mock-ups
13. Tool rooms

C. Suggested Activities

Shop Practice

1. Have all students demonstrate shop cleaning.
2. Set aside various days when housekeeping is done following the basic content.
   Example: Before school lets out for Christmas, spring holidays, open house, school closing, etc.
3. Practice keeping aisles and walkways free of tools, creepers, and any materials which might cause you or your fellow worker to trip or stumble.

Classroom

1. Student continues notebook work and makes materials for his folder.
2. Make a do and don't list.
   Example: Drawing and describing:
   a. Keep floors clean of tools and rubbish.
   b. Don't pile paint or grease soaked clothes in a corner.

4. Have students clean work areas.
5. Floors should be kept clean after each day.
6. Oil, paint, or other materials that are spilled should be cleaned up immediately.
7. Metal-covered containers should be used for dirty, used cloths.
8. Bathroom containers must be emptied.
9. Used paper shop towels and other paper products should be placed in a separate, covered container.
10. Separate containers should be available for broken glass, jagged metal, etc.

3. Make a vocabulary list for displaying in classroom as well as using in shop talk.
4. Create mock-ups for bulletin boards and classroom discussions.
5. Help students to assess their own characteristics and behavioral attitudes toward shop maintenance.

A. Performance Objectives

Upon completion of this unit, the students will be able to:

1. Identify auto glass types using sight identification.
2. Remove and replace fractured and otherwise damaged auto glass safely and with maximum efficiency.
3. Determine causes of non-collision glass breakage, perform mechanical and structural adjustments, and replace broken glass under instructional supervision.

B. Basic Content

1. Broken glass removal
   a. Safety and mechanical procedures
2. Installation (all areas)
   a. Doors
   b. Rear vision
   c. Windshield
   d. Rear quarter
   e. Ventilators
3. Glass channel installation
4. Regulators
   a. Repair
   b. Installation
5. Correcting causes of breakage

C. Suggested Activities

Shop Practice

1. From used doors, have students remove and replace window glass regulators.
2. Have students examine window channels.
3. Have students install auto glass to channels only.
4. Stress safety at all times.
5. Mechanically install window regulators.

Classroom

1. Continue notebook and folder. Make mock-ups showing qt. glass, vent glass, and windshield.
2. Work on vocabulary for unit.
3. Explain the window regulator spring-load clip on door handles.
4. Demonstrate the various tools and make a list of the useful tips for notebooks.
5. Audio, video materials
6. Evaluation. Help students to classify information in their notebooks (using their media).

6. Maintain a window regulator:
   a. Grease
   b. Oil
   c. Align
7. Remove all fixtures from door interior
8. Safekeep all fixtures.

A. Performance Objectives

Upon completion of this unit, the students will be able to:

1. Repair the damaged areas according to accepted standards.
2. Demonstrate the proper sanding methods for preparation of priming.
3. Mask the vehicle according to the needs and instructional specifications.
4. Apply the primer surfaces through demonstration.
5. Meet the needs of the original finish by appropriate compounding.
6. Thin the paint to factory specifications and perform painting operations.
7. Clean car and work station in a safe and workmanlike manner.

B. Basic Content

1. Equipment and materials
   a. Spray gun
   b. Solvent cleaner
   c. Sandpaper
   d. Air sander
   e. Rubbing compound
   f. Masking tape
   g. Thinner
   h. Paint strainers
   i. Glazing putty
   j. Block (sanding)
   k. Tack rag
   l. Air transformer

C. Suggested Activities

Shop Practice

1. Continue lecture relating with classroom.
2. Demonstrations
   Example:
   a. Prepare the item that is to be painted.
   b. Select the basic shop materials.
   c. Demonstrate sanding techniques

Classroom

1. Notebook work and folder work are very important in this unit (working at a media he understands).
   Example: Draw and describe the spray gun.
2. Build vocabulary
   a. Print and post for classroom visual.

d. Demonstrate compounding techniques.
e. Demonstrate spraying with primer.
f. Demonstrate the care and cleaning of the spray gun.

3. Objects to be used: parts of automobiles or any other object such as metal office furniture, or other metal objects that require refinishing.
4. Students can be given a sheet of metal 20" X 20 to bring to the prime stage. The same sheet of metal later on can be used for the refinishing stage. Each student can have his own individual project for instructor's evaluation as well as his own and his peer group. Negative as well as positive lessons can be understood here.

3. Have students categorize materials:
   a. Sandpaper
   b. Types of thinner
4. Have empty cans for students to visually see:
   a. Pint can
   b. Quart can
   c. One-gallon can
   d. Five-gallon can
5. Explain how many pints to the quart, quarts to the gallon, gallons to the five gallons, etc.
6. Explain what 50% of thinner to the gallon of paint means:
   a. Explain it is a half-gallon.
   b. Explain it is two quarts.
7. Have students make mock-ups on this for folders.
8. Demonstrate using water.
9. Evaluate conditions:
   a. Procedures for ventilation.
   b. Respiration mask.

A. Performance Objectives

Upon completion of this unit the students will be able to:

1. Identify and demonstrate all skills required of an efficient auto body mechanic.
2. Refine and perfect previously established skills and techniques by performing more complex learning experiences.
3. Identify their own self worth within the auto body repair industry.
4. Develop beginning estimating techniques while overviewing total time, materials, and production demands of given jobs.

B. Basic Content

1. All the basic skills needed by the auto body mechanic.
   a. Forming basic shapes in body metals
   b. Tools (review)
   c. Safety
2. All sheet metal parts
3. Evaluate different steps and procedures for each.

C. Suggested Activities

Shop Practice

1. In relation with classroom discussion, review, identify, and demonstrate all skills required for basic straightening. Perform the same techniques with more complex situations.
2. Demonstrations:
   Example:
   a. Straighten a door panel that should be replaced by a new one.
   b. Straighten a section around a headlamp assembly or tail lamp assembly; these areas have straight, convex, and concave sections.
3. Except for straightening, proper power tool handling can be demonstrated.

Classroom

1. Lecture. Students can review and identify picks, dollies, hammers, jacks, and other equipment needed to do more complex repair work.
2. More complex parts of the automobile can be used for vocabulary such as:
   a. Radiator support
   b. Inner fender shields
   c. Baffles
   d. Wheel wells
   e. Hood gap checking between cawl.
3. Decal replacement can be discussed here.

4. Evaluate different steps and procedures for each.
5. Decal installing can be demonstrated. (The station wagon wood look, etc.)

A. Performance Objectives

Upon completion of this unit, the students will be able to:

1. Demonstrate basic competence acquired by performing basic refinishing tasks.
   a. Compounding and sanding
   b. Use of spray gun
   c. Safety precautions
      (1) Clothing
      (2) Tool usage
      (3) Masques
2. Students apply all given costs of paint.
   a. Undercoating
   b. Top coats
3. Students blend colors effectively for correct color and shade matching.
4. Students identify and correct all problem spots under instructional direction and supervision.
5. Students continue to demonstrate abilities to work cautiously and neatly with minimum interference to other ongoing shop projects.
6. Students spray both enamels and lacquers to factory standards and finish.

B. Basic Content

1. Automotive finishes
   a. Differentiated
2. Basic shop materials and their use
3. Sanding and compounding
4. Shop equipment and layout
5. The spray gun
6. Housekeeping and storage
   a. Personal safety devices
   b. Think safety
7. Surface preparation
   a. Preliminary steps
   b. Preparing the surface
8. Undercoats, thinners, and reducers
   a. Undercoats and their application
   b. Thinners and reducers
9. Topcoats and their application
   a. Topcoats and color matching
   b. Applying the topcoat

10. Products, painting problems, glossary
    a. Refinishing products and their uses
    b. Painting problems – cause and cure
    c. Glossary
11. Using the manufacturer's color book, look up paint colors.

C. Suggested Activities

Shop Practice

1. Using the 20" X 20" sheet metal panels that have been primed, have the students spray paint them in the different types of refinishes. The acrylic lacquer can be compounded. The instructor can scratch the same panel and have the student repair the damaged area (not paint the complete panel); blending can be demonstrated.
2. Live work as well as various car parts or any type of metal furniture can be sprayed.

Classroom

For student folder:

1. Make a list of paint problems – their cause and cure.
   Example:
   a. Runs and sags
   b. Starved film
   c. Orange peel
   Example: Cure
   a. Runs and sags: gun held too close or moved too slowly; also caused by too much paint flow or too little air pressure.
2. Make a glossary list for notebook as well as for posting in the classroom.
3. Have empty gallon cans on display in classroom.
   Prep – sol – solvent
   Metal conditioner
   Fish eye eliminator
   Lacquer thinner
   Enamel reducer
   Have place cards for each explaining where used, performance, etc.
4. Audio, video materials

A. Performance Objectives

Upon completion of this unit, the students will be able to:

1. Perform given operations not as individual entities, but part of total job requirements.
2. Work individually or collectively upon total jobs and individual entities.
3. Continue to refine and perfect established skills and techniques by performing similar tasks to varied circumstances.
4. Differentiate when to replace as opposed to when to straighten a given component part.

B. Basic Content

1. The complete:
   a. Door assembly
   b. Hood assembly
   c. Deck lid assembly
   d. Body panels
2. Welding
   a. Spot
   b. Acetylene
3. Tools
   a. Hand
   b. Power
4. Alignment of sheet metal
5. Straightening
6. Safety precautions

C. Suggested Activities

Shop Practice

1. On old door panels, the student can demonstrate the removing of a door panel (keeping in mind that all the component parts are usable).
2. After the panel is removed, have the student straighten and align all the door check or frame. Check to make sure:
   a. Window regulator works.
   b. Door lock operates.
   Service these parts with lubrication.

Classroom

1. The student working individually on his folder and notebook can collect and draw materials for this unit.
2. Review all safety precautions.
3. Define alignment. What does it mean when two parts are adjacent to each other?
4. Review tools.

3. Do the same with an old car by removing the door panels, quarter panels, etc.

A. Performance Objectives

Upon completion of this unit, students will be able to know the basics and the jargon of the various types of frames and equipment for frame straightening.

B. Basic Content

1. Rules and procedures
2. Types of frames
   a. Perimeter frame
   b. Ladder frame
   c. X-type frame
   d. Unitized construction
   e. Unitized with bolt-on stub frame
   f. Platform construction
3. Frame straightening
   a. Complete Bear rack
   b. All types of jacks
4. Basic blueprint reading
5. Glossary

C. Suggested Activities

Shop Practice

1. Have various types of cars in the shop to see the different types of frames.
2. Discuss their construction.
3. Visit the Auto Body class during a frame straightening job.

Classroom

1. The student will continue developing materials for his folder using the medium he can best work in.
   a. Purpose of frame.
      Example: Supports engine, wheels and body.
   b. Types of frames. List using the basic content.
      Example: Have students draw and describe cut-out pictures of types of frames.
   c. How constructed
   d. Purpose of cross-members
   e. Make mock-ups
   f. Increase vocabulary
   g. Develop bulletin board on the unit.
   h. Audio, video materials

A. Performance Objectives

Upon completion of this unit, the student will be able to know the basics and jargon of wheel alignment.

B. Basic Content

1. Rules and procedures
2. Types of suspension systems
3. Theory of wheel alignment
4. Alignment equipment
5. Castor – camber – toe in
6. Tracking
7. Tire and wheel balance
8. Glossary

C. Suggested Activities

Shop Practice

1. The student can make visual checks on tire wear.
2. The student can check steering play in the steering wheel. Causes and cures can be discussed.
3. A visit to the Auto Body Shop in school gives the student an opportunity to examine wheel alignment equipment and the alignment rack.
4. Give a demonstration using the rack and its equipment for alignment.

Classroom

1. In the student folder, wh alignment materials a equipment can be gathered.
2. Mock-ups can be developed.
3. Vocabulary list can be increa using the wheel alignm glossary.
4. The student can draw, descri name, and paint out front parts.
   Example:
   a. Knuckles
   b. King pins
   c. Knuckle supports
   d. Upper and lower con arms
   e. Shock absorbers
   f. Springs
   g. Stabilizer
5. Audio, video materials

A. Performance Objectives

Upon completion of this unit, students will be able to:

1. Demonstrate their ability to learn the standard terms and definitions used in writing estimates.
2. Define abbreviations used in parts books and flat-rate manuals.
3. Identify the make, model, and year of a car, and to locate information needed to order parts.
4. Identify parts as the manufacturer portrays them.
5. Figure the estimated times on a job.
6. Figure the flat-rate times on a job.
7. Follow the sequence of inspection used to inspect and list collision damage.

B. Basic Content

1. Writing the estimate and inspection sequence:
   a. Inspection sequence
   b. Chassis group
      (1) Bumper assembly
      (2) Frame assembly
      (3) Hood assembly
      (4) Front fender assembly
      (5) Tires and wheel assembly
      (6) Brakes
      (7) Suspension
      (8) Steering linkage
      (9) Steering gear
   c. Power group
      (1) Cooling
      (2) Engine
      (3) Electrical
      (4) Fuel and exhaust
      (5) Clutch
      (6) Transmission
      (7) Rear suspension
   d. Body group
      (1) Top
      (2) Front
      (3) Sides
      (4) Back
      (5) Floor
      (6) Doors

(7) Rear lid
(8) Headlining
(9) Front and side trim
(10) Seats
(11) Convertible and vinyl tops
(12) Instruments

e. Air conditioner

f. Paint, material and time

C. Suggested Activities

Shop Practice

1. The students can estimate damaged areas on cars in the shop.
2. Look up car and model identifications.
   Example:
   a. Ask student to look up the model year.
   b. Paint code number. Have him look up that number in the car color book.
3. He can be asked to point out various inner panels.
4. List all the side panels of a car and develop an estimate for removing and replacing.

Classroom

1. This unit can bring together all the trade vocabulary and the students' materials that they drew, pictures they brought in, and mock-ups that have been developed in helping to understand estimating.
2. Basic problems can be developed on operation time.
   Example:
   The flat rate for repairs at Bill's Auto Body is $10.00 per hour. The estimated time to repair a door panel is 2 hours. How much does Bill charge the owner of the automobile for repairs to the door panel?
3. The classroom and the shop can work together on listing and developing estimates.

STUDENT PROGRESS CHART

AUTO BODY
ADAPTIVE DEVELOPMENTAL

Student's Name: _____ **Date** **Instr. Signature**

I. Auto Body Repair Helper _____
- A. Safety _____ _____
- B. Hand Tools _____ _____
- C. Bench Work Power Tools _____ _____
- D. Bolts & Screws _____ _____
- E. Basic Refinishing _____ _____
- F. Frame Alignment _____ _____
- G. Front-end Alignment _____ _____
- H. Estimating _____ _____
- I. Shop Maintenance _____ _____

II. Body Assembler _____
- A. Basic Straightening _____ _____
- B. Assembly & Disassembly _____ _____
- C. Oxyacetylene Welding _____ _____
- D. Electric Arc & Spot Welding _____ _____

III. Auto Painter Helper _____ _____ _____
- A. Advance Refinishing Preparations _____ _____

IV. Auto Painter _____ _____ _____
- A. Advance Refinishing _____ _____
- B. Doors, Hoods, Deck Lids, Body Panels _____ _____

STUDENT VOCATIONAL INVENTORY

AUTO BODY

S–SATISFACTORY
U–UNSATISFACTORY

Student's Name: _____ **Grade** _____ **Instr. Signature** _____

I.	Personal Habits		
	A. General appearance	_____	_____
	B. Attendance	_____	_____
	C. Attitude towards co-workers	_____	_____
	D. Attitude towards instructor	_____	_____
	E. Self-awareness	_____	_____
	F. Willingness to adjust to regulations, policies, change	_____	_____
	G. Use of class time	_____	_____
	H. Overall class behavior	_____	_____
II.	Work Habits		
	A. Initiative	_____	_____
	B. Proper work habits	_____	_____
	C. Accuracy of work	_____	_____
	D. Speed	_____	_____
	E. Endurance	_____	_____
	F. Observance of safety rules	_____	_____
	G. Accident record	_____	_____